A Chemical Approach to Controlling Cell Fate and Function.

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Authors: W Li, K Jiang, S Ding

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Public Summary:
Stem cells are essential for maintaining tissue homeostasis and mediating physiological and pathological regeneration. Recent breakthroughs in stem cell biology have generated tremendous enthusiasm and hope for the therapeutic potential of stem cells in regenerative medicine. However, this research is still in an early development stage. An improved understanding of stem cell biology is required to precisely manipulate stem cell fate and to harness these cells for regenerative medicine. Small molecules, targeting specific signaling pathways and mechanisms, are powerful tools for manipulating stem cells for desired outcomes. Those small molecules are increasingly important in probing the fundamental mechanisms of stem cell biology and facilitating the development of therapeutic approaches for regenerative medicine. These could involve cell replacement therapies with homogenous functional cells produced under chemically defined conditions in vitro and the development of small-molecule drugs that modulate patience's endogenous cells for therapeutic benefit.

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